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Computer Code Abstracts

CCA - 93

1. Name of Code: TYCHE III
2. Computer for which Code is Designed: IBM 7094;
   Programing System: FORTRAN/FAP
3. Nature of Problem Solved: TYCHE III is a Monte Carlo code designed to find the second, fourth and sixth moments of the neutron slowing-down density distribution in an infinite homogeneous medium. Use is made of analytic techniques to simplify the description of the neutron history in space; consequently, only the angle of scattering and the energy loss at each collision are needed to find the moments. The moments are found by use of recursion relations which allow the higher moments to be found in essentially the same time as the second. Neutron weights are used to avoid the termination of a history by absorption and to minimize the running time. Provisions are made for restart of non-converged problems, graphical displays of the moments and average fission energy as a function of the number of sets of histories and calculation of the correction to flux moments.
4. Restrictions on the Complexity of the Problem: No more than 1200 points can be used for the energy grid, 5 elements and 150 sets of anisotropic scattering coefficient sets per element.
5. Typical Running Time: 2000 histories/min in predominantly hydrogeneous media and about 350 in carbon on an IBM 7094.
6. Present Status: In use.
7. *References:*

[1]R. A. Blaine, "TYCHE, A Monte Carlo Slowing Down Code," NAA-SR-7357 (June, 1962).

[2]R. A. Blaine, "Improvements to the TYCHE Moments Code and Operating Instructions for TYCHE III," NAA-SR-MEMO-9802 (May, 1964).

[3]R. A. Blaine, "ISRCH, A Binary Search FORTRAN Function Subprogram," NAA-SR-MEMO-9721 (April, 1964).

[4]M. Hoffman and W. A. Rhoades, "AICRT 3, A General Code for the Display of Digital Data," NAA-SR-MEMO-9069 (October, 1963).

8. Material Available through Argonne Code Center:
   a. Code Abstract
   b. FORTRAN-FAP Source Deck
   c. Binary Library
   d. Sample Problems
   e. Reference Reports (4)

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CCA - 104

1. Name of Code: PRISM
2. Computer for which Code is Designed and others upon which it is Operable: IBM 7094
3. Nature of Physical Problem Solved: PRISM calculates multigroup microscopic inelastic- and elastic-scattering transfer matrices. For the case of inelastic scattering, the bound-energy levels of the target nucleus are treated as discrete when both the levels and their probabilities of excitation as functions of the incident neutron energy are known. When such detailed information is lacking, the calculation is based on the Weisskopf evaporation model. Elastic scattering is treated as the special case of inelastic scattering for which there is a single discrete energy level with zero threshold energy.
4. Method of Solution:
5. Restrictions on the Complexity of the Problem: 60 groups; 59 downscatter
6. Typical Running Time: One minute for both the elastic and inelastic matrices for 18 groups with 5 groups downscatter.
7. Unusual Features of the Program: PRISM was developed under the Atomics International